



**JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND
TECHNOLOGY**

SCHOOL OF ENGINEERING AND TECHNOLOGY

**UNIVERSITY EXAMINATIONS FOR THE DEGREE OF SCIENCE IN
RENEWABLE ENERGY TECHNOLOGY AND MANAGEMENT**

FOURTH YEAR FIRST SEMESTER 2015/2016 ACADEMIC YEAR

CENTRE: MAIN CAMPUS

COURSE CODE: TET 3413

COURSE TITLE: ENERGY CONSERVATION AND MANAGEMENT

EXAM VENUE: AH 2

STREAM: BSc RE TECH & MGT

DATE: 12/10/2015

EXAM SESSION: 5.00 – 7.00 PM

TIME: 2 HOURS

Instructions to candidates

The paper contains FIVE questions.

Answer question ONE and any other TWO questions.

Candidates must hand in their answer booklets to the invigilator while in the examination room.

QUESTION ONE (COMPULSORY)

- a) Explain what is fuel substitution and give an example of fuel substitution used in an industry. (2 Marks)
- b) What are some of the factors to be considered before procuring fuels for energy efficiency and economics. (2 Marks)
- c) Outline five responsibilities an energy manager. (5 Marks)
- d) Define the following terms (5 Marks)
 - 1. Energy supply
 - 2. Energy storage
 - 3. Energy management
 - 4. Energy conservation
 - 5. Production factor
- e) Outline three considerations that are taken in mind before determining the type of an energy audit to be carried out in a factory. (3 Marks)
- f) Outline the four principles of energy management. (4 Marks)
- g) List any four important factors involved in deciding final cost of purchased electricity. (4 Marks)
- h) State three important technical feasibility parameters that one should consider during analysis of energy conservation opportunities. (3 Marks)
- i) Outline four basic parameters that an energy auditor will concentrate on when carrying an energy audit. (2 Marks)

QUESTION TWO

- a) Outline five benefits of conforming to ISO 50001 for any institution. (5 Marks)
- b) Compare and contrast between energy efficiency and energy conservation. (7 Marks)
- c) State four ways in which an educational institution can implement to maximize the system efficiency in relation to energy usage. (4 Marks)
- d) To carryout economic evaluation, an analysis has to be done on some documents like invoices and electricity bills. State what of kind information can be retrieved from these documents. (4 Marks)

QUESTION THREE

- a) The energy committee in Siaya county want to implement energy conservation in the county
Discuss five energy conservation opportunities that can be implemented. (8 Marks)
- b) Discuss four steps followed in energy conservation planning. (8 Marks)
- c) What do you understand by 'plant energy performance' (PEP) (4 Marks)

QUESTION FOUR

- a) Discuss the format of an energy audit report. (12 Marks)
- b) Discuss any eight base line data that an audit team should collect while conducting detailed energy audit. (8 Marks)

QUESTION FIVE

- a) Distinguish between 'preliminary energy audit' and 'detailed energy audit'. (4 Marks)
- b) Write down the steps involved in 'Energy management Strategy program' (EMP). (8 Marks)
- c) Outline steps involved in 'detailed energy audit' in a systematic order. (8 Marks)